

Self-Employment Matching: An Analysis of Dual Earner Couples and Working Households

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ABSTRACT. This paper explores the significance of intra-couple and intra-household influences on self-employment. It may be the case that employment type matching is prevalent whereby individuals within a couple or household are characterised by similar types of employment. Alternatively, an individual may pool income risk with his/her partner by holding a diversified portfolio of employment types within the household thereby introducing an element of intra-household risk pooling. Such an arrangement may be particularly appropriate if one member of the couple is self-employed. We utilise ordered probit and random effects ordered probit analysis to explore the prevalence of employment matching and/or risk pooling within couples or households. Our empirical analysis which is based on cross-section data drawn from the British *Family Expenditure Surveys* 1996 to 2000 provides evidence of employment type matching both within dual earner couples and, to a lesser extent, in the wider context of working household members.

KEY WORDS: Dual Earner Couples; Performance Related Pay; Random Effects Ordered Probit Model; Self-employment.

JEL CLASSIFICATION: J20, J23, J24, J12

1. Introduction

Over the last decade, the self-employed have emerged as an important group of workers in many developed countries. The increasing proportion of self-employed individuals in the labour force has led to interest amongst both economists and policy makers in the characteristics of the self-employed. Recent research has, for example, focused on the attributes of the self-employed concentrating on characteristics such as gender, ethnicity and father's occupation – see Le (1999) for a comprehensive survey of this area.

Hence, family background and individual characteristics appear to be important determinants of an individual's observed type of employment. One might also predict that intra-household influences such as the type of employment of one's spouse may also affect an individual's observed type of employment. Individual characteristics such as marital status, for example, have been incorporated into some empirical studies of self-employment. Blanchflower and Oswald (1990) and Bernhardt (1994), for instance, find that having a working spouse enhances the probability of self-employment.

In a similar vein, recent literature has focused on the similarity of employment status within

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couples (see, for example, Bradbury et al., 1986; Dawkins et al., 2001). These studies argue that the phenomenon of ‘assortative mating’ may offer an explanation. The assortative mating theory states that individuals are more likely to match with individuals with similar characteristics to themselves such as age and education levels and this explains why they have similar labour market experiences.¹ In general, this literature has concentrated on exploring the growing phenomenon of jobless households.

We extend this concept further by exploring the similarity of employment types within dual earner couples as well as across all working members of the household focusing on self-employment.² To be specific, we argue that two possible situations may arise. First, it may be the case that intra-couple and intra-household employment type matching is prevalent whereby individuals within a couple are, for example, both self-employed. Second, it may be the case that couples risk pool and, hence, that holdings of diversified portfolios of types of employment within couples/households – thereby implying informal insurance arrangements – are more common. The aim of our empirical analysis is to determine which situation is more likely.

We generalise our analysis by focusing on a range of types of employment (such as self-employment, PRP and fixed wage contracts), which are explored collectively rather than in isolation.³ PRP is regarded here as a hybrid of self-employment and fixed wage employment such that there is a fixed and a variable component to remuneration. Our data which is drawn from the British *Family Expenditure Surveys* 1996 to 2000 is particularly appropriate for our purpose since it harbours the key facets required for our analysis, containing detailed information on employment as well as individual and household characteristics.

Our modelling strategy is based on ordered probit and random effects ordered probit analysis given that we order employment types according to the implied degree of ‘income risk’ associated with each type of employment. We assume that fixed wage employment is characterised by the least income risk and self-employment characterised by the most income risk with PRP lying somewhere between these two extremes. Given

the general consensus that self-employment is inherently more risky than fixed wage employment, our ranking in terms of income risk seems appropriate. Whilst the ordered probit approach allows for the ordering in the dependant variable, we further extend our analysis by adopting a random effects framework allowing us to investigate the correlation across types of employment within couples whilst controlling for similarities within couples.

Our empirical evidence lends support for the phenomenon of employment contract type matching within couples and households – this finding is particularly pronounced in the case of self-employment. It may be the case that the benefits of matching with similar people may simply outweigh the benefits of income risk pooling. Alternatively, transfers of specialised human capital within dual earner couples and within households may increase the associated benefits of holding matched contract types.

The paper proceeds as follows: Section 2 sets our analysis into context whilst Section 3 presents a detailed discussion of our statistical framework and Section 4 describes the data. Section 5 presents our findings and Section 6 concludes our analysis.

2. Background

2.1. The self-employment decision

To a large extent this literature has concentrated on the factors that induce individuals towards self-employment, with particular emphasis being placed on risk. This was first considered by Knight (1921) who focused on the ability to operate under uncertainty and to bear the risk of business failure as factors influencing the decision to enter self-employment.

Since Knight (1921), the literature has tended to focus on the dichotomy between self-employment and either paid-employment or unemployment. The underlying intuition is that individuals choose whether or not to pursue self-employment on the basis of the relative utilities on offer.

A seminal contribution to this literature was the paper by Lucas (1978), the thrust of which is the observation that a full employment, closed economy equilibrium will involve some

individuals becoming entrepreneurs and creating firms that will in turn employ others. The distribution of self-employed and salaried labour will depend crucially on the distribution of demographic characteristics across the population, in particular individual specific endowments of entrepreneurial acumen.

Lucas' approach was adapted to include risk explicitly by Kanbur (1979) and Kihlstrom and Laffont (1979). Kihlstrom and Laffont (1979) developed a special case of Knight's (1921) model of entrepreneurial choice by focusing on how individuals choose between a risky, but potentially highly remunerated, entrepreneurial career, and a lower, but risk-free, fixed wage whilst Kanbur (1979) incorporates both risk and entrepreneurial talent into his model of occupational choice.

Despite Knight's (1921) emphasis on uncertainty most studies have focused on risk, assuming some stochastic influence on business outcomes with a given structure that agents can either observe or learn. This randomness has been accounted for in a number of ways (Parker, 1997). A popular approach has been to introduce a random variable directly into the production function of the self-employed (Kihlstrom and Laffont, 1979; Lippman and Rumelt, 1982; Evans and Jovanovic, 1989). Another approach has been to incorporate random variation in the costs with which individuals can produce a given output (Jovanovic, 1982).

The most recent research has focused on the attributes of the self-employed generally rather than on their propensity to take risk *per se*. Such studies can, however, offer some insight into the relationship between risk and self-employment – attributes that are likely to increase (decrease) the risk of self-employment are often found to be negatively (positively) associated with entrepreneurship. One such aspect is access to finance. There is growing evidence that liquidity constraints conspire to frustrate many individuals in their desire to pursue entrepreneurship (see Blanchflower and Oswald, 1998).

Similarly, one might expect marriage, especially to a working partner, to dilute the risk of self-employment and thus increase the probability of self-employment. Evidence for this is found by Taylor (1996), Clarke and Drinkwater (2000) and

Georgellis and Wall (2000). Taylor (1996) includes attitudes towards job security to capture risk preference and finds that those who have a preference for job security prefer paid-rather than self-employment.

Burke et al. (2000, 2002) model explicitly the influence of non-pecuniary factors on both the propensity and performance of entrepreneurs. The traditional view has been that such factors might reduce conventional success in terms of wealth creation (Blanchflower and Oswald, 1990, Cressy, 1995). Burke et al. however, argue that an entrepreneur who is highly motivated by non-profit objectives such as job satisfaction might have a relatively lower disutility of effort and, as a result, might exert even greater (entrepreneurial) effort in the business venture. If, however, an entrepreneur is highly motivated towards non-pecuniary unprofitable self-employed activities, then he/she confronts a trade-off and will choose an optimal mix of profit and non-pecuniary motivation.

2.2. Household influences on employment type

Economists have long acknowledged that individuals, who live in some form of social unit, take into account the preferences and utilities of other members of their social unit, see, for example, Smith (1759). The aim of our paper is to explore the possibility that intra-couple and/or intra-household influences exist over an individual's observed type of employment. It may be the case that matching exists such that individuals within a family unit are characterised by similar types of employment. Alternatively, individuals may pool income risk with their partner – a self-employed person alleviating the intrinsic risks associated with self-employment by being married to a fixed wage partner.

Similar issues were discussed by Becker (1974) in his treatise on the economics of marriage. Becker suggested that high earning males might optimally match with females specialising in home production, a phenomenon he referred to as 'negative assortative mating on the basis of earnings'. More recent research on spousal selection and marital sorting has proffered support for positive earnings matching. Nakosteen and

Zimmer (2001), for example, find that individuals whose earnings are above average tend to marry individuals with similar earnings traits.

There is some evidence that self-employment propensity acts as a sorting mechanism, with individuals similarly inclined to self-employment more likely to marry *ceteris paribus*, Bruce (1999). Bruce finds evidence that a husband's experience of self-employment increases the probability that his wife will become self-employed. Moreover, the effect of a husband's self-employment is found to be largest if he is self-employed when the wife is considering the transition to self-employment. This could be indicative of the importance of intra-household transfers of human capital, such transfers raising the productivity and, thereby, the earnings capacity of self-employment.

Similar evidence highlighting the importance of inter-generational transfers of human capital is provided by Dunn and Holtz-Eakin (2000) who find evidence of inter-generational transfers of human capital – the existence of a self-employed parent having a larger effect on a child's self-employment transition probability than the financial wealth of the parent.⁴ In a similar vein, De Wit and van Winden (1989) find that an individual's propensity to become self-employed is enhanced if his father was self-employed or commenced self-employment at a later stage whilst Lindh and Ohlsson (1996) find that having a self-employed father (mother) impacts positively (insignificantly) on the probability of self-employment. Thus, it may be the case that the children of self-employed parents have the opportunity to acquire the necessary human capital from a relatively young age resulting in them setting up their own businesses or becoming involved in the family business.⁵

Similar arguments for the transmission of valuable work experience, reputation or managerial human capital from parent to offspring can be made across partners and, in addition, across household members in general. Lombard (2001) analyses wage residuals as measures of observed characteristics of spouses before and after marriage; the assumption being that individuals harbour characteristics not captured in the data but are observed by peers prior to marriage.⁶ The results suggest that the probability of being self-employed is higher with a

self-employed husband and lower if married to a wage/salary worker. Moreover, the results also indicate that having a self-employed husband exerts a large and positive influence on the earnings of self-employed females highlighting the importance of intra-couple transfers of human capital.

A similar argument can be generated from Lazear (2002) who purports that entrepreneurs are essentially 'jack-of-all-trades', not excelling in one skill but competent in many. Lazear argues that entrepreneurs are the single most important players in the economy, requiring an ability to combine and manage the talents of others. The implication is that individuals with a 'balanced' skill base are more likely to become entrepreneurs, and Lazear proffers convincing empirical support for this proposition – the single most important determinant of entrepreneurship being a background in a large number of different roles. Although Lazear's analysis is based on single individuals, it is not difficult to envisage a generalisation across couples – potential and actual entrepreneurs might be attracted to each other because of the potential for skill-pooling.

The evidence summarised above alludes to a matching of employment types, especially for the case of self-employment. Schiller and Crewson (1997), on the other hand, find evidence of intra-couple risk pooling with a husband's primary employment increasing the probability that a wife will be observed in self employment. As argued by Le (1999), marriage is assumed in the economics literature to represent stability and, as such, may provide a suitable background for risky self-employment.⁷ Given that Blanchflower and Oswald (1990) and Bernhardt (1994) find that having a working spouse enhances the probability of self-employment, this may include financial stability.

To summarise, it appears to be the case that the incidence of self-employment within a couple has significant implications for the observed employment status of the other party – although the literature to date is somewhat inconclusive. A common feature of the existing literature, however, has been its focus on the case of self-employment vis a vis fixed wage employment. The above studies clearly neglect the fact that in reality a broad spectrum of

types of employment exists with self-employment and fixed wage employment at the two opposing extremes of the spectrum. Moreover, the omission of intermediate cases such as PRP may lead to biased estimates and erroneous inferences. The uniqueness of our approach is that we set our analysis within a more general framework by focusing on a range of types of employment namely self-employment, contracts characterised by PRP and fixed wage contracts. Furthermore, we extend the existing literature by considering all working members of the household as an additional facet to our analysis of dual earner couples.

3. Statistical framework

Our dependent variable is categorical in nature, i.e. taking the value of 1 if the individual is a fixed wage worker, 2 if she/he is a PRP worker and 3 if she/he is self-employed. We expect that individual attributes and household characteristics will be important in explaining variations in individuals' probabilities of being characterised by a specific type of employment. Our modelling strategy is to conduct ordered probit analysis and random effects ordered probit analysis.

Our approach is to consider what kind of individual is likely to be characterised by each type of employment whilst imposing an ordering that reflects their relative income uncertainty. The ordering is based on the implied degree of 'income risk' associated with each type of employment with fixed wage employment characterised by the least income risk, self-employment characterised by the most income risk and PRP lying somewhere between these extremes. Our raw data supports this hypothesis with the standard deviation of earnings around the mean being 204.34 for fixed wage employment, 326.70 for PRP employment and 481.70 for self-employment for sample of dual earner couples.⁸ Turning to the sample of working household members, the standard deviations of earnings around the mean are 206.99 for fixed wage employment, 363.23 for PRP employment and 615.07 for self-employment.⁹ As discussed in the previous section, the effect of risk on self-employment is an issue which has attracted much attention in the literature (see, for example, Parker, 1996).

The ordered probit model is based on a latent regression framework where:

$$Y_i^* = \beta' X_i + \varepsilon_i \quad (1)$$

Although, Y_i^* is unobserved, we observe Y_i such that:

$$Y_i = 1 \text{ if } Y_i^* \leq \mu_1 \quad (2)$$

$$Y_i = 2 \text{ if } \mu_1 < Y_i^* \leq \mu_2 \quad (3)$$

$$Y_i = 3 \text{ if } Y_i^* > \mu_2 \quad (4)$$

where the μ 's and β are the unknown parameters to be estimated. Assuming that ε_i is normally distributed across observations with a mean of zero and a variance of one, we obtain the following probabilities:

$$P(Y_i = 1) = \Phi(\mu_1 - \beta' X_i) \quad (5)$$

$$P(Y_i = 2) = \Phi(\mu_2 - \beta' X_i) - \Phi(\mu_1 - \beta' X_i) \quad (6)$$

$$P(Y_i = 3) = 1 - P(Y_i = 1) - P(Y_i = 2) \quad (7)$$

where $\Phi(\cdot)$ denotes the cumulative standard normal distribution.

Our set of explanatory variables (the vector X_i) contains a host of variables which represents individual attributes and household characteristics thought to be important in explaining variations in individuals' observed type of employment. The individual characteristics we investigate are the person's gender, age and level of education.¹⁰ In addition, we control for job specific characteristics such as occupation and industry.¹¹ The household characteristics we control for are the household's level of income,¹² the number of pre-school children in the household, the number of school age children, housing tenure, geographical regions, survey year and the economic status of other individuals aged 18 years and above living in the household, i.e., those who are unemployed, sick, retired, in further education or unoccupied. We also include a set of dummy variables that

represents the employment type of other working members of the household.

Finally, in order to ascertain whether employment type matching or risk pooling is prevalent, we also include the employment type of the individual's partner in the set of explanatory variables.¹³

Our second statistical framework is based on a random effects model, which allows us to investigate the correlation across types of employment within couples whilst controlling for matching within couples on other characteristics. This approach is especially appropriate given that individuals within couples are likely to be similar in many ways in terms of both observable and unobservable characteristics as discussed in the literature review presented in Section 2.

The panel dimension of our model arises from the fact that we observe both members of each working couple. Given that the sampling frame of the FES is at the household level, we are able to create a balanced panel of data for working couples. The model is specified as follows:

$$Y_{ci}^* = \beta' X_{ci} + v_{ci} \quad (8)$$

$$v_{ci} = \alpha_c + \eta_{ci} \quad (9)$$

where Y_{ci}^* is the unobservable propensity for income risk of individual i in couple c ; Y_{ci} is the individual's observed type of employment (such that $i = 1, 2$ denoting each member of the couple); X_{ci} is a vector of exogenous characteristics which are expected to influence Y_{ci}^* ; β is the associated vector of coefficients; α_c is the 'couple' specific unobservable effect and η_{ci} is a random error term. We assume a random effects specification, where $\eta_{ci} \sim \text{IN}(0, \sigma_\eta^2)$, and in order to marginalise the likelihood it is assumed that, conditional on the X_{ci} , α_c are $\text{IN}(0, \sigma_\alpha^2)$ and are independent of the η_{ci} and the X_{ci} . This implies that the correlation between the error terms of individuals who are married/cohabiting is a constant given by:

$$\rho = \text{corr}(v_{il}, v_{ik}) = \frac{\sigma_\alpha^2}{\sigma_\alpha^2 + \sigma_\eta^2} \quad l \neq k \quad (10)$$

Thus, ρ represents the proportion of the total variance contributed by the panel level variance

component. A fuller discussion of the Random Effects Probit model and the associated likelihood function can be found in Arulampalam (1999). The likelihood is computed using 20 point Gauss-Hermite quadrature (see Butler and Moffitt, 1982).

Finally, we investigate the possibility that employment type matching/income risk pooling may occur across all working household members rather than simply within dual earner couples. The model is identical to that described by Equations (8)–(10) above with the c subscript replaced with a unique household identifier, h where h goes from 1 to H . Thus, for the analysis of all working members of the household, we create an unbalanced panel of data where the minimum number of working individuals in the household is one and the maximum number is seven.

The set of explanatory variables (the vector X_i) is identical to before except that partner's type of employment is no longer included as the random effects model reorganises our data into a panel whereby each member of the couple (household) represents a repeated observation for the couple (household). In addition, the set of dummy variables representing the employment type of other working members of the household are omitted from the random effects model of all working household members since these individuals become observations within our working household members sample.

4. Data

Our data is drawn from the *Family Expenditure Survey* (FES) for Great Britain, which is a nationally representative cross-section survey that has been conducted on an annual basis since 1957. Some 10,000 households are selected each year to take part in the FES, and the average response rate is around 70%. The main aim of the survey is to provide a reliable source of information on household expenditure, income and other aspects of household finances. To account for seasonal differences in expenditure, face-to-face interviews are spread evenly over the year. Each individual aged 16 or over in the households visited is asked to keep diary records of daily expenditure for two weeks. Respondents

are also asked to complete an income questionnaire. The FES is especially appropriate for our purposes since it contains detailed information on employment type, individual specific characteristics and household specific characteristics. Given that the focus of our analysis concerns the determinants of the current employment status of individuals within couples rather than the formation of couples, the cross-sectional nature of the FES is adequate for our purposes.

We use data from 1996 to 2000 and include working adults aged between 16 and 65 who are employed under either a fixed wage contract, a contract characterised by PRP or are self-employed.¹⁴ Prior to this period, the dataset had a slightly different structure and some of the variables required for our analysis are not available. From this data, we generate two samples. Initially, we concentrate on matched working couples (i.e., we have observations on both partners). This gives us a sample of 9276 working couples yielding a total of 18,552 observations. Second, we extend our analysis by exploring correlations across working members of households – this gives us a sample of 31,862 workers living in 19,604 households.

Table AI in the Appendix presents the distribution of types of employment across the sample by various individual and household characteristics for the sample of dual earner couples. Table AIII in the Appendix presents the same information as Table AI for the sample of working household members whilst Table AII in the Appendix presents information pertaining to the distribution of type of employment within dual earner couples.

4.1 *Dual earner couples*

We can see from Table AI that men are more likely to be self-employed, but the majority of employed men (and women) hold fixed wage contracts. Hence, fixed wage contracts are the dominant form of employment across the individual and household specific characteristics but there are interesting differences in the relative incidence of employment types given these characteristics.

The proportion of individuals in self-employment increases across the age groups, which is consistent with the hypothesis that older people who

find themselves out of employment often turn to self-employment given that their chance of re-employment is low. Alternatively, this is also consistent with the hypothesis that older people face less liquidity constraints perhaps due to the accumulation of wealth/savings and are therefore better able to absorb the income uncertainty associated with self-employment.¹⁵ Moreover, they may also have the capital necessary to start a business.

Individuals in self-employment have a high probability of having no formal qualifications. PRP, on the other hand, is concentrated amongst people with formal school qualifications and above, whilst individuals holding fixed wage contracts are evenly spread across all levels of schooling. Hence education appears to be an important factor in explaining the probability of receiving PRP or being self-employed but may not be an important factor in explaining why individuals hold fixed wage contracts.

With respect to the occupational class variables, we find that the incidence of fixed wage employment increases as the level of skill associated with the job falls, being concentrated in the partly skilled and unskilled categories. PRP is most common among professionals, managers and skilled workers and the incidence of self-employment is high for professional and unskilled workers.

In relation to household characteristics, we find that the correlation with household income suggests that PRP employees live in the richest households and fixed wage employees live in the poorest households.¹⁶ One might also hypothesise that the number of children and the age of children could affect their parent's willingness to take on income risk, we therefore look at the number of pre-school and school age children in the household. Pre-school children are distributed evenly across employment types, but the average number of school age children is higher for self-employed workers, this is probably due to the fact (highlighted earlier) that self-employed workers are on average older than workers on PRP or fixed wage employment contracts.

In relation to housing tenure, fixed wage employees are most likely to be found living in rented accommodation (local authority and

private rented). The incidence of self-employment is lowest for individuals living in local authority rented properties. This may be associated with a lack of collateral with which to secure loans necessary to start up a small business given that housing equity is often used as collateral. The incidence of PRP, on the other hand, is highest amongst owner-occupiers.

Finally we explore the employment status of other members of the household. We find that the presence of an unemployed, sick or a fixed wage person in the household is higher for people holding fixed wage contracts. Having a retired person in the household is more likely for self-employed workers – this might be related to the fact that self-employed people are on average themselves older. Unoccupied people are less common in the households of PRP employees who are most likely to reside with another PRP employee. Being self-employed is more highly correlated with having a person in the household who is in full-time education, but this might be explained by the fact that the self-employed tend to be older and therefore are more likely to have children in further education. The presence of another self-employed person in the household is higher for the self-employed people in our sample. This might be due to the fact that household members may become absorbed into the family business.

Table AII presents the distribution of employment type within dual earner couples where both partners are working. It is apparent that regardless of partner one's type of employment, partner two is most likely to be a fixed wage employee given that this is the most common type of employment. This suggests that couples may be pooling their income risk. If partner one's employment is characterised by income risk, i.e., PRP or is self-employed, he/she can offset that risk by having a partner with a fixed wage contract.

Thus, the patterns in the raw data provide some preliminary evidence of intra-household risk pooling. However, closer examination also reveals a high level of employment type matching within couples. Fixed wage employees are more likely to be paired with another fixed wage employee and the incidence of PRP couples and self-employed couples is also relatively high.

4.2. Working household members

Table AIII differs from Table AII in as much as the sample now contains all working members of the household, thus we have included marital status variables and the variables for the type of employment of other household members are clearly no longer necessary. We still, however, consider the economic status of household members who are out of the workforce.

The story remains virtually unchanged, so we will concentrate on the differences only. With respect to marital status, we find that fixed wage employees are most likely to be separated, widowed, divorced or single as opposed to being married. PRP employees more likely to be single and self-employed individuals are most likely to be married. The patterns in the status of other household members now change; whilst the unemployed and the sick household members are still concentrated among fixed wage employees, retired household members also join this group. The incidence of unoccupied people in the household becomes more frequent for the self-employed.

The discussion above is based on relationships observed in the raw data. Detailed econometric analysis is necessary to substantiate the robustness of these findings. To summarise, our preliminary review of the raw data suggests that some of the determinants of employment type are likely to be observable individual and household characteristics such as those shown in Tables AI, AII and AIII.

5. Results

Our results are presented in Tables AIV and AV in the Appendix. Table AIV presents results from the ordered probit analysis whilst Table AV presents results from the random effects analysis.

5.1. Ordered probit analysis

Turning initially to the ordered probit analysis of dual earner couples, we will begin by discussing personal characteristics and then move on to consider household specific characteristics. A very strong finding is that women are less likely to encounter income risk, i.e. become

self-employed.¹⁷ In accordance with the findings of Rees and Shah (1986), our results suggest that age impacts concavely (albeit at the 10% level) on income risk.

The estimated coefficients on the education variables indicate that higher levels of education are positively associated with income risk. Hence, our results suggest that higher levels of human capital as proxied by education are associated with self-employment. Similarly, evidence by Borjas (1986), Rees and Shah (1986), Borjas and Bronars (1989) and Evans and Leighton (1989) suggests that educational attainment is positively correlated with the probability of self-employment.¹⁸ Relative to professional and unskilled workers, we find that as the level of skill associated with the job falls, the corresponding level of income risk falls.

Turning to household characteristics, the findings presented in Table AIV accord with our observations from the raw data discussed in Section 4. Household income is positively associated with income risk. It should be noted, however, that the estimated coefficient is somewhat small in magnitude although statistically significant. Home ownership – owner occupied and owned outright – is positively related to income risk. It might be the case that the self-employed have greater wealth in the form of assets relative to fixed wage employees. In a similar vein, Kidd (1993) and Bernhardt (1994) find that the availability of capital plays a key role in models of self-employment. To be specific, Bernhardt (1994) finds working wives, home ownership and the availability of investment income to be positive and significant indicators of the probability of self-employment.

Regarding the employment status of adult household members other than one's partner, we find that unemployed individuals are less likely to reside in households where another household member's employment is characterised by income risk. It might be the case that self-employed individuals are less likely to have an unemployed individual in the household as they are able to absorb other household members into his/her business. Moreover, Borjas (1986) argues that such an arrangement may minimise the risk of employees shirking given that family members employed within the family business

may have the same incentive, i.e. to maximise family profit.

Finally, our findings related to the employment types of other working household members suggest that the phenomenon of employment matching in the wider context of working household members is dominated by the case of self-employment.

The variables pertaining to the nature of the employment of the individual's partner indicate that the degree of income risk associated with an individual's type of employment is positively correlated with the degree of income risk associated with his/her partner's employment suggesting that employment type matching is observed in dual earner couples rather than the holding of a diversified portfolio of employment contracts.¹⁹ This effect is particularly pronounced in the case of having a self-employed partner.

Finally, the significance of the cut-off points in the ordered probit analysis is often regarded as a test of the significance of ordering in the dependent variable. In our case, the highly significant estimated cut-off points indicates the presence of ordering in our dependant variable which supports the use of the ordered probit model.

5.2. Random effects analysis

In order to investigate the robustness of our findings we also conduct random effects ordered probit analysis which allows us to explore the correlation within couples in terms of employment type, whilst controlling for the possibility that individuals within couples may be similar. Indeed, the random effects framework allows us to establish how much of the variation in employment types within couples can be explained by unobservable intra-couple correlations.

The estimated coefficients presented in Table AV relate to the sample of dual earner couples and accord with our previous findings and, therefore, we centre our discussion on the value of ρ where ρ represents the proportion of the total variance in the dependant variable contributed by the panel level variance component. We find that ρ is highly significant and its magnitude suggests that 11% of the total variance in the employment contracts within each couple is explained by the couple specific effect.²⁰ Thus,

given that the couple specific effect explains 11% of the unobserved variance and that the couple specific effect is based on correlations across the dependant variable within couples, our findings provide some evidence of intra-couple correlation within the dependant variable lending further support for employment type matching.

Whilst our primary focus is on dual earner couples, for completeness given the evidence presented in Tables AIV and AV pertaining to other working household members, we extend our panel analysis to all working household members. This allows us to consider the hypothesis that the phenomenon of employment type matching is prevalent in the broader context of the household rather than being confined to dual earner couples. The estimated coefficients for this specification generally accord with our other models. As one would expect broadening the sample size to include all working household members adds greater heterogeneity to our sample and thus the size and statistical significance of some of the household composition variables increases. Moreover, we find that the size of ρ is smaller (at 8%) than in the case of dual earner couples but is of similar significance. Hence, even within this broader grouping of individuals, the variance component specification is still appropriate, i.e. a significant household specific effect remains. These findings, thus, provide further evidence highlighting the importance of employment type matching.

The high degree of consistency across the results derived from our three sets of results highlights the robustness of our findings. Indeed, Table AVI, which presents sample proportions and average predicted probabilities derived from our empirical analysis, suggests a significant degree of uniformity in the predictions derived from the various econometric models. To summarise, our analysis provides evidence of employment type matching both within dual earner couples and, to a lesser degree, in the wider context of working household members.

6. Conclusion

The aim of our paper was to explore the significance of intra-couple and intra-household influences for observed employment type by analysing a sample of working couples and an

extended sample of working household members. To be specific, we have focused on ascertaining the prevalence of employment type matching whereby individuals within a couple or household are characterised by similar types of employment.

Previous literature confirms that the incidence of self-employment within a couple has significant implications for the observed employment status of the other party – although the literature to date is somewhat inconclusive. From our analysis of the *Family Expenditure Surveys* 1996 to 2000, we present some evidence suggesting that individuals are likely to group with other individuals with similar (as opposed to diversified) types of employment providing support for the phenomenon of employment matching within couples and households. Furthermore, this finding appears to be particularly pronounced for the case of self-employment. Two possible explanations for this phenomenon are as follows. First, the benefits of matching with similar people may simply outweigh the benefits of income risk pooling. Indeed, the assortative mating literature suggests that people may find such ‘like-minded’ people in the workplace. Unfortunately, given the cross-sectional nature of our data, we are unable to investigate the employment contracts of our couples at the time when they met. However, our focus here has concerned the current employment types of individuals within couples rather than the process by which couples form. Second, transfers of specialised human capital within dual earner couples and within households may increase the associated benefits of holding matched types of employment. Such transfers of human capital may enhance the earnings potential within couples and households. Furthermore, the benefits from enhanced earnings for couples and households matched on self-employment and PRP may be of sufficient magnitude to offset the income risk associated with such types of employment.

Unfortunately, whilst our data allows us to quantify the degree to which matching occurs within dual earner couples and within working household members, it does not allow us to differentiate between these two competing explanations. Moreover, it is likely that both have a significant role to play in determining the degree of employment matching identified by our

analysis. Hence, one important area for future research may lie in the analysis of panel rather than cross-section data in order to ascertain the reasons why employment type matching occurs.

It is apparent that if the two explanations put forward above are correct, then employment type matching has important implications. Transfers of human capital within couples and within households enhance earnings potential via enhanced productivity. Thus, it is apparent that employment matching may have significant implications for the productivity of matched individuals and, hence, for the economy as a whole.

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Appendix:

TABLE AI

	Fixed wage	Prp	Self-employed
Summary statistics sample: members of dual earner couples ^a			
<i>Gender</i>			
Males	58.78	25.05	16.17
Females	75.41	17.75	6.84
<i>Age</i>			
16 < Age < 19	92.68	4.88	2.44
20 < Age < 29	66.48	27.59	5.93
30 < Age < 39	66.81	22.52	10.66
40 < Age < 49	68.24	19.46	12.30
Age > 50	66.05	17.97	15.98
<i>Education level</i>			
Less than GCSE	67.47	18.42	14.12
GCSE	66.77	21.99	11.25
Further Education	66.71	23.73	9.56
Higher Education	67.63	21.08	11.29
<i>Occupation</i>			
Professional	54.42	25.72	19.86
Managerial & technical	67.91	22.79	9.29
Skilled	65.83	22.35	11.83
Partly skilled	70.79	17.35	11.87
Unskilled	76.24	11.74	12.02
<i>Housing Tenure</i>			
Rented local authority	73.05	17.76	9.19
Rented private	70.65	17.61	11.74
Owner occupier	66.73	22.56	10.72
Owned outright	63.62	17.00	19.38
<i>Average Household income (£)</i>	686.79	775.56	717.35
<i>Children (Average Number)</i>			
Pre school Children	0.25	0.26	0.22
Children aged between 5 and 18 years	0.59	0.50	0.64
<i>Household composition^b</i>			
Unemployed person	0.020	0.014	0.014
Sick person	0.004	0.002	0.003

TABLE AI
Continued

	Fixed wage	Prp	Self-employed
Retired person	0.006	0.005	0.009
Unoccupied person	0.007	0.004	0.008
Full-time education	0.054	0.038	0.060
Fixed wage person	0.148	0.125	0.158
PRP person	0.033	0.039	0.030
Self-employed person	0.006	0.006	0.015

^a Numbers are expressed as a percentage of the total number of individuals across the three types for each individual characteristic.

^b The following set of dummy variables refers to the presence or otherwise of at least one individual in the household 16 years of age and above (other than the respondent and his/her partner) exhibiting the stated characteristic e.g., being unemployed or in full time education. The figure represents the mean value of the dummy variable.

TABLE AII
Distribution of contract type within dual earner couples

		Partner 1					
		Fixed wage Number	Per Cent	PRP Number	Per Cent	Self-Employed Number	Per Cent
Partner 2	Fixed wage	8862	71.20	2338	58.88	1246	58.36
	PRP	2338	18.79	1276	32.13	357	16.72
	Self-employed	1246	10.01	357	8.99	532	24.92

TABLE AIII

	Fixed wage	PRP	Self-employed
Summary statistics sample: all working members of the household ^a			
<i>Gender</i>			
Males	60.19	24.79	15.02
Females	76.55	17.32	6.13
<i>Marital status</i>			
Married	66.48	21.40	12.12
Separated/widowed/divorced	71.67	18.10	10.23
Single	72.48	22.06	5.46
<i>Age</i>			
16 < Age < 19	84.47	13.79	1.74
20 < Age < 29	69.54	24.96	5.50
30 < Age < 39	66.56	23.05	10.39
40 < Age < 49	67.51	19.19	12.56
Age > 50	66.83	17.70	15.47
<i>Education level</i>			
Less than GCSE	68.35	18.24	13.41
GCSE	68.07	21.50	10.43
Further Education	67.69	23.50	8.81
Higher Education	67.65	21.44	10.90
<i>Occupation</i>			
Professional	56.81	25.34	17.85
Managerial & Skilled	66.94	22.14	10.92
Partly skilled	72.41	17.01	10.58
Unskilled	78.27	11.70	10.03

TABLE AIII
Continued

	Fixed wage	PRP	Self-employed
<i>Housing Tenure</i>			
Rented local authority	76.01	16.77	7.22
Rented private	70.80	17.77	11.44
Owner occupier	66.43	23.15	10.42
Owned outright	77.23	17.44	15.32
<i>Average Household income (£)</i>	613.92	714.53	652.70
<i>Children (Average Number)</i>			
Pre school Children	0.21	0.24	0.23
Children aged between 5 & 18 years	0.48	0.40	0.58
<i>Household composition^b</i>			
Unemployed person	0.043	0.038	0.031
Sick person	0.039	0.030	0.020
Retired person	0.046	0.036	0.039
Unoccupied person	0.080	0.100	0.138
Full-time education	0.054	0.039	0.059

^a Numbers are expressed as a percentage of the total number of individuals across the three types for each individual characteristic.

^b The following set of dummy variables refers to the presence or otherwise of at least one individual in the household 16 years of age and above (other than the respondent and his/her partner) exhibiting the stated characteristic e.g., being unemployed or in full time education. The figure represents the mean value of the dummy variable.

TABLE AIV

Ordered probit analysis sample: members of dual earner couples	β	t-stat	Marginal Effects		
			FW	PRP	SE
<i>Personal Characteristics</i>					
Female	-0.4000	-18.05	0.138	-0.079	-0.059
Age/10	0.1974	2.37	-0.068	0.039	0.029
Age squared/100	-0.0181	-1.81	0.006	-0.004	-0.003
GCSE	0.0513	1.80	-0.018	0.010	0.008
Further Education	0.0742	2.28	-0.026	0.015	0.011
Higher Education	0.1047	2.90	-0.036	0.021	0.015
<i>Occupation</i>					
Managerial & technical	-0.2243	-5.62	0.077	-0.044	-0.033
Skilled	-0.2065	-4.86	0.071	-0.041	-0.030
Partly skilled	-0.1926	-4.01	0.066	-0.038	-0.028
Unskilled	-0.2707	-4.55	0.093	-0.053	-0.040
<i>Household Characteristics</i>					
Household income/1000	0.0751	3.40	-0.026	0.015	0.011
Pre school Children	0.0035	0.18	-0.001	0.001	0.001
Children aged 5–18 years	0.0154	1.31	-0.005	0.003	0.002
Rented private	0.0722	1.26	-0.025	0.014	0.011
Owner occupier	0.1412	3.52	-0.049	0.028	0.021
Owned outright	0.2929	5.78	-0.101	0.058	0.043
<i>Household Composition</i>					
Unemployed person	-0.1912	-2.49	0.066	-0.038	-0.028
Sick person	-0.3386	-1.86	0.117	-0.067	-0.050
Retired person	0.0224	0.18	-0.008	0.004	0.003
Unoccupied person	-0.1184	-0.94	0.041	-0.023	-0.017
Full-time education	-0.0017	-0.04	0.001	0.000	0.000

TABLE AIV
Continued

Ordered probit analysis sample: members of dual earner couples	β	t-stat	Marginal Effects		
			FW	PRP	SE
Fixed wage person	-0.0296	-1.00	0.010	-0.006	-0.004
PRP person	-0.0409	-0.77	0.014	-0.008	-0.006
Self-employed person	0.2738	2.47	-0.094	0.054	0.040
Cohabit/married to PRP employee	0.2521	10.67	-0.087	0.050	0.037
Cohabit/married to self-employee	0.5415	17.86	-0.187	0.107	0.080
Cut-off point 1	1.0951	5.49			
Cut-off point 2	1.9663	9.84			
Industry		Yes			
Region		Yes			
Sample Year		Yes			
Number of Observations		18552			
Log likelihood		-13944.957			
Pseudo R squared		0.1121			
Chi-Squared Statistic		3521.71 (53 d.f.)			

^a The marginal effects are calculated at the mean values of the explanatory variables.

^b Omitted categories are male, less than GCSE, professional, living in rented local authority housing.

TABLE AV
Random effects ordered probit models

	Sample									
	Dual Earner Couples					Working Household Members				
	β	t-stat	Marginal Effects			β	t-stat	Marginal Effects		
			FW	PRP	SE			FW	PRP	SE
<i>Personal Characteristics</i>										
Female	-0.3365	-15.03	0.153	-0.021	-0.132	-0.3009	-17.46	0.009	-0.008	-0.001
Age/10	0.2160	2.42	-0.075	0.010	0.065	0.4723	9.04	-0.014	0.013	0.001
Age squared/100	-0.0196	-1.83	0.007	-0.001	-0.006	-0.0449	-7.05	0.001	-0.001	0.000
Separated/widowed/divorced	-	-				-0.0320	-1.08	0.001	-0.001	0.000
Single	-	-				-0.0976	-3.80	0.003	-0.003	0.000
GCSE	0.0576	1.91	-0.020	0.003	0.017	0.0660	2.87	-0.002	0.002	0.000
Further Education	0.0818	2.37	-0.028	0.004	0.024	0.0947	3.62	-0.003	0.003	0.000
Higher Education	0.1123	2.93	-0.040	0.005	0.035	0.1439	5.01	-0.004	0.004	0.000
<i>Occupation</i>										
Managerial & technical	-0.2343	-5.55	-0.086	0.012	0.074	-0.1463	-4.57	0.004	-0.004	0.000
Skilled	-0.2146	-4.78	-0.079	0.011	0.068	-0.1683	-4.99	0.005	-0.005	0.000
Partly skilled	-0.2107	-4.16	-0.074	0.010	0.064	-0.1953	-5.18	0.006	-0.005	-0.001
Unskilled	-0.3047	-4.85	-0.103	0.014	0.089	-0.3186	-6.89	0.010	-0.009	-0.001
<i>Household Characteristics</i>										
Household income/1000	0.0911	3.83	-0.029	0.004	0.025	0.0434	2.68	-0.001	0.001	0.000
Pre school Children	0.0062	0.29	-0.001	0.000	0.001	0.0371	2.21	-0.001	0.001	0.000
Children aged 5-18 years	0.0186	1.47	-0.006	0.001	0.005	0.0121	1.26	0.000	0.000	0.000
Rented private	0.0834	1.34	-0.028	0.004	0.024	0.1629	4.30	-0.005	0.005	0.000
Owner occupier	0.1625	3.73	-0.054	0.007	0.047	0.1739	6.27	-0.005	0.005	0.000
Owned outright	0.3554	6.44	-0.112	0.015	0.097	0.2708	7.88	-0.008	0.008	0.001

TABLE AV
Continued

	Sample									
	Dual Earner Couples					Working Household Members				
	β	t-stat	Marginal Effects			β	t-stat	Marginal Effects		
			FW	PRP	SE			FW	PRP	SE
<i>Household Composition</i>										
Unemployed person	-0.2447	-2.93	-0.073	0.010	0.063	-0.1072	-2.68	0.003	-0.003	0.000
Sick person	-0.4071	-2.06	0.129	-0.018	-0.112	-0.1696	-3.79	0.005	-0.005	0.000
Retired person	0.0488	0.36	-0.009	0.001	0.007	-0.1102	-2.72	0.003	-0.003	0.000
Unoccupied person	-0.1478	-1.09	-0.045	0.006	0.039	0.0403	1.50	-0.001	0.001	0.000
Full-time education	-0.0127	-0.26	-0.001	0.000	0.001	-0.0403	-1.10	0.001	-0.001	0.000
Fixed wage person	-0.0397	-1.23	-0.011	0.002	0.010	-	-	-	-	-
PRP contract person	-0.0488	-0.84	-0.016	0.002	0.013	-	-	-	-	-
Self-employed person	0.3466	2.87	-0.105	0.014	0.090	-	-	-	-	-
Cut-off point 1	1.1278	5.28				1.6531	11.85			
Cut-off point 2	2.0374	9.51				2.5589	18.26			
ρ	0.1147	8.16				0.0768	8.11			
Industry			Yes					Yes		
Region			Yes					Yes		
Sample Year			Yes					Yes		
Number of Observations			18552					31862		
Log likelihood			-14089.011					-23844.285		
Chi-Squared Statistic			3158.97 (51 d.f.)					5242.03 (50 d.f.)		

^a The marginal effects are calculated at the mean values of the explanatory variables.

^b Omitted categories are male, less than GCSE, professional, living in rented local authority housing.

TABLE AVI
Sample proportions and average predicted probabilities

	FW %	PRP %	SE %
<i>Dual Earners</i>			
Sample Proportions	67.09	21.40	11.51
Ordered Probit	67.16	21.30	11.54
Random Effects Ordered Probit	67.87	21.67	10.46
<i>Working Household Members</i>			
Sample Proportions	67.96	21.24	10.80
Random Effects Ordered Probit	69.10	21.12	9.78

Notes

¹ Indeed, it may be the case that such people are likely to meet their partners in the workplace.

² We use the term couples to refer to individuals who are either married or cohabiting.

³ The PRP schemes include Christmas bonuses, productivity bonuses, profit related bonuses, loyalty bonuses, dividends, incentive schemes and performance/sales bonuses.

⁴ See Blanchflower and Oswald (1998) for a detailed discussion of the link between family assets and self-employment.

⁵ Similar evidence highlighting the importance of intergenerational transfers of career specific human capital in the case

of the medical professional is reported by Lentz and Laband (1989).

⁶ Such findings introduce an additional dimension to the debate over whether marriage is productivity enhancing which centres around the evidence suggesting that married men earn more than unmarried men. Korenman and Neumark (1991) present evidence suggesting that marriage is productivity enhancing whilst Cornwell and Rupert (1997) present evidence to the contrary. It may be the case that any productivity effects may be enhanced if partners match on employment type.

⁷ If this is true, the risk preferences of couples may be different from those of the rest of the population and this raises concerns about potential selection bias when we look at our

sample of dual earners. Unfortunately, our cross-section data set does not allow us to model the selection into marriage. If marriage is seen as risk pooling behaviour then our sample of dual earners are likely to be more risk averse than the general population and thus our results will underestimate the desire to match employment types within the wider population.

⁸ Our hypothesis that PRP generates a relatively risky stream of income accords with the results of Seiler (1984) who finds that 'incentive' workers in the US manufacturing sector experience higher yet more dispersed earnings than 'time rate' workers. Similarly, Rees and Shah (1986) find that the variance of earnings for the self-employed is over three times that of paid employees.

⁹ Although our findings support the hypothesis that self-employment and PRP are associated with relatively high degrees of income risk, we acknowledge that other factors may be present which affect income risk such as temporary versus permanent employment and other such contractual arrangements. Unfortunately our data does not allow us to control for such influences.

¹⁰ In the case of the random effects specification on the sample of all working members of the household, we also include dummy variables to capture marital status.

¹¹ Control variables such as occupation, industry and regional were included in our set of explanatory variables to control for labour demand side influences which may clearly affect an individual's observed employment contract.

¹² We use household income rather than individual income given that individual income may be highly correlated with employment type.

¹³ It may be the case that individuals within couples are similar in many ways such as educational background and industry. Inclusion of such characteristics of the partner as explanatory variables within our model, however, is clearly problematic as they are highly correlated with type of employment.

¹⁴ A small number of individuals with more than one job, individuals employed by the armed forces and agricultural workers were excluded from the analysis.

¹⁵ See Blanchflower and Oswald (1998) for a detailed analysis of the importance of capital constraints for the probability of becoming self-employed.

¹⁶ It should, however, be noted that different types of employment may be characterised by different levels of average income. This issue was discussed in Section 3.

¹⁷ Burke et al. (2002) found that the desire to be one's own boss was a positive and significant determinant of choosing self-employment for both males and females. For males, however, non-pecuniary motivation had a positive impact on the value of the business – self employed males who previously declared the importance of independence tended to generate extra business value *ceteris paribus*. This was in sharp contrast to female entrepreneurs, for whom the desire for autonomy had a negligible effect on their performance. Burke et al. also found that post-compulsory education and professional training were positively

associated with the size and value of male, but not female, enterprises; having children is positively related to the self-employment probability of males and relatively less-qualified females, whilst vocational qualifications were negatively associated with the probability of male, but not female, self-employment. To investigate these issues on our data we ran separate ordered probit regressions for the men and women. The results – available on request – highlighted some significant gender effects. Age increases (at a decreasing rate) male, but not female, self-employment; household income increases income risk for both males and (especially) females; education, particularly post-compulsory education, raises the probability of income risk for males and (especially) females, whilst having a sick household member dramatically reduces female, but not male, income risk. Finally, our findings regarding employment matching follow through to the separate genders, the degree of income risk associated with the employment of both male and female respondents being positively correlated with the income risk associated with their partner's employment. And again, the effect is particularly pronounced in the case of having a self-employed partner.

¹⁸ The result does, however, contrast with Burke et al. (2002) who find a negative correlation between higher education and the probability of male self-employment. Burke et al.'s analysis is based on a cohort of individuals drawn from the *National Child Development Study* aged 33 at the time of survey. For comparison we re-estimated our ordered probit analysis for the 1796 male members of our dual earners couples aged 30–35. Our results – available on request – show high levels of education to be an insignificant correlate of self-employment.

¹⁹ It may be the case that our matching result captures the effect of couples who jointly run family businesses. One proxy that has been used in the literature to identify such couples is to identify those couples who match identically on both self-employment type and the three digit industry classification (see, for example Bruce, 1999 and Lombard, 2001). Following this methodology, we find that 173 out of 523 couples who are both self-employed may be regarded as running a family business together.

²⁰ In the case where ρ equals zero, the panel level variance component is unimportant. In this case, the panel estimator is no different from the pooled estimator.

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